IN THE DRAWINGS

The attached sheet of drawings includes changes to Fig. 8C. This sheet, which includes Fig. 8C, replaces the original sheet including Fig. 8C.

Attachment: Replacement Sheet

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-8, 10-13, 16, and 18-21 are pending, with Claims 3, 4 and 7 withdrawn from consideration, Claim 6 amended, and Claims 9, 14, 15, 17, 22 and 23 cancelled by the present amendment.

In the Official Action, the election of species was modified; Claim 6 was rejected under 35 U.S.C. §112, second paragraph; Claims 1, 8, 10, 12, 13, 16, 18, 20 and 21 were rejected under 35 U.S.C. §102(b) as being anticipated by Cluzeau (FR2738669); Claims 2, 5 and 6 were rejected under 35 U.S.C. §103(a) as being unpatentable over Cluzeau in view of Fabian (DE2053881); and Claims 11 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Cluzeau in view of Kassing (DE3049153). It appears from the Official Action that the specification remains objected to.

The specification is amended in response to the outstanding objection. No new matter is added.

In response to the rejection under 35 U.S.C. §112, second paragraph, Claim 6 is amended to depend from Claim 2.

Figure 8C is amended to correct an error (in original Figure 8C target 80 was inverted.) Amended Figure 8C is consistent with originally filed Figure 7B and 7C and introduces no new matter.

Applicants request rejoinder of Claims 3-4 as these claims depend from Claim 1.

Briefly recapitulating, Claim 1 is directed to a target intended to emit neutrons when bombarded with particles, comprising neutron emissive parts and neutron non-emissive parts which are juxtaposed, only the neutron emissive parts emitting neutrons during the

bombardment with particles, said emissive and non-emissive parts being arranged so as to form a pattern as a coded mask.

In the figures of Cluzeau, references 9 and 29 represent the target and references 36 and 65 are masks. Reference 36 is a pinhole mask of a first embodiment and reference 65 is a coded mask of a second embodiment. References 7 and 27 represent an ion beam. Figure 6 of Cluzeau shows the target 29, the coded mask 65 and the α particles detector 35 but not the ion beam. Figure 2 shows the ion beam 27.

Figures 2 and 3 of Cluzeau describe a first embodiment including a neutron generating tube with a pinhole mask. Figure 5 of Cluzeau describes an alternative embodiment where the pinhole mask 36 is replaced with the coded mask 65 (see page 18, lines 30-32, which recites "*il est en effet possible de remplacer le masque à sténopé 36 par un masque 65, figure 5, percé de plusieurs trous 66, technique d'imagerie connue par les opticiens sous le nom d'imagerie par masque codé),*" which translates to "It is indeed possible to replace the mask with pinhole 36 by a mask 65, figure 5, pierced with several holes 66, technique of imagery known by the opticians under the name of imagery by coded masks." See also page 21 the definition of the 3 classes of TED. The relative positions of the target and the mask and the ion beam are the same ones whatever the nature of the mask may be.

With either embodiment of Cluzeau, the collision between a nucleus of deuterium and a nucleus of tritium in the target supplies a neutron with an energy close to 14 Mev and an α particle with an energy of around 3.6 Mev (see page 1, lines 29-33. "*La collision entre un noyau de deuterium et un noyau de tritium, dans la cible, fournit un neutron nanti d'une énergie rpoche de 14 Mev, et une particule alpha (particule α) nantie d'une énergie d'environ 3, 6 MeV*").

In the neutron generating tube of Cluzeau, when a neutron 11 is emitted, an α particle 12 is also emitted in an opposite direction (see Figures 1, 2). The neutron 11 is emitted through the thickness of the target: see page 9, lines 14-21 which recites: "*Le faisceau ionique 7 frappe la cible 9 pour y produire une réaction de fusion nucléaire de type ^{3} H(d,n)^4 He. Cette réaction est symbolisée à la figure 1 par l'émission simultanée d'un neutron 11 (à travers l'épaisseur de la cible) et d'un noyau d'Hélium, c'est-à-dire une particule α 12, en direction opposée, colinéairement en première approche à la trajectoire du neutron*" which translates to "The ion beam 7 strikes the target 9 in order to produce a nuclear fusion reaction of *^{3}H(d,n)^4 He* type." This reaction is symbolized in Figure 1 by the simultaneous emission of a neutron 11 (through the thickness of the target) and of a Helium core, i.e., an α particle 12, in opposed direction, collinear in first approach with the trajectory of the neutron."

Page 10, lines 13-16 also recites "*A chacune de ces particules α correspond, en direction inverse, c'est-à-dire á l'intérieur d'un angle solide inversé Ω2, l'emission d'un neutron, émis avec une énergie de 14 MeV à travers l'épaisseur de la cible 9*", which translates to "With each one of these α particles corresponds, in opposite direction, i.e., inside a reversed solid angle Ω2, the emission of a neutron, emitted with an energy of 14 MeV through the thickness of the target 9."

However, contrary to the Official Action, the target of Cluzeau **does not comprise neutron non-emissive parts**, even if the mask is associated with the target.

In Cluzeau, the mask (i.e., the coded mask 65 or the pinhole mask 36) is located between the target 9, 29 and the α particles detector 35. The mask (i.e., the coded mask 65 or the pinhole mask 36) is used to stop (i.e., to filter or to code) the α radiation (see page 11, lines 34-35, "*le masque (36), destiné à arréter le rayonnement α..*" which translates to "the mask (36), intended to stop the α radiation ..."

The mask (i.e., the coded mask 65 or the pinhole mask 36) of Cluzeau codes the α radiation. That is, the mask (i.e., the coded mask 65 or the pinhole mask 36) defines α particles emissive parts and α particles non emissive parts with α particle detector 35.

The whole surface of the target of Cluzeau emits neutrons (see page 12, lines 26-28: "*en admettant que l'émission neutronique du tube soit en première approximation homogène sur toute la surface S' de la cible bombardée par le faisceau d'ions,*" which translates to "by admitting that the neutron emission of the tube is homogeneous at first approximation on the whole surface of the target bombarded by the ion beam," see also page 20, line 37 to page 21, line 1 which recites "*une première classe consiste en un TED émettant des neutrons sur toute la surface de sa cible...*" which translates to "a first class consists of a TED emitting of the neutrons on the whole surface of its target...." Thus the target 29 associated with the mask (i.e., the coded mask 65 or the pinhole mask 36) of Cluzeau **does not code the neutron beam but codes only the α particles beam.**

In addition, the mask of Cluzeau (i.e., the coded mask 65 or the pinhole mask 36) does not code an ion beam. On page 10, lines 29-31 Cluzeau notes that the ion beam strikes the target on its whole useful surface: "*...le faisceau d'ions, lequel frappe la cible sur toute sa surface utile qui se compte alors, en cm^2 et non plus en mm^2*" which translates to "...the ion beam, which strikes the target on its whole useful surface area which amounts then in cm^2 and not in mm^2." The mask (i.e., the coded mask 65 or the pinhole mask 36) is ***not*** located between the target 29 and the ions source 26 (see Figure 2). Thus, the ion beam does not go through the mask (i.e., the coded mask 65 or the pinhole mask 36). Instead, on page 11, line 15-16, Cluzeau notes that the ion beam strikes the target on a surface of about 1.5 cm^2. Page 12, line 3, Cluzeau describes that the hole of the mask is about 1 mm^2. The mask (i.e., the coded mask 65 or the pinhole mask 36) is not located on the path of the ion beam 27.

Furthermore, if the ion beam went across the mask, the tube of Cluzeau would not function. The tube of Cluzeau can only function if the mask is offset from the ion beam. The mask is not located against the target. Instead, the mask is spaced from the target (see page 11, line 30, point O' in Figures 2 and 3). In Figure 6, S_0 is a source on the target 29 and r_1, r_2, r_3 are the holes of the coded mask 65. With this arrangement, it means that the ion beam has not crossed the mask because the holes of the mask are not in front of the source S_0. If the ion beam crosses the mask, the source S_0 cannot emit neutrons and α particles.

In Applicants' claimed invention, the target has neutron emissive parts and neutron non-emissive parts, where the neutron beam emitted by the target is coded. An α particles beam is also coded by the target in the same manner as the neutron beam. Each neutron sent towards the object has an associated α particle sent towards the α particles detector. The α particles do not meet an obstacle on their path towards the detector (see Figure 8).

In Cluzeau, each neutron sent towards the object does not have necessarily an associated α particle sent towards the α particles detector because the mask filters the α particles. Many neutrons are useless because their associated α particle is blocked by the mask and does not reach the α particles detector.

With Applicants' claimed invention, it is not difficult to avoid the neutron non-emissive parts from emitting neutrons. In practice, the ions cannot create neutrons after having crossed some metal micrometers. If the mask is thick enough and hard enough, the ions cannot reach the neutron emissive material located beneath the mask (if there is neutron emissive material beneath the mask). Edge effects are extremely limited. If a lateral diffusion occurs on some micrometers (the neutron emissive parts have a diameter of about 1 millimeter), the α particles associated with neutrons cannot reach the α particles detector because they cannot cross the mask. These features are not possible with the device of Cluzeau.

MPEP § 2131 notes that "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). See also MPEP § 2131.02. "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Because Cluzeau does not disclose or suggest all the features recited in Claim 1, Cluzeau does not anticipate the invention recited in Claim 1, and all claims depending therefrom.

Accordingly, in view of the present amendment and in light of the previous discussion, Applicants respectfully submit that the present application is in condition for allowance and respectfully request an early and favorable action to that effect.

Respectfully submitted,

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